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Title:
Are the Basins of Tui Regio and Hotei Arcus Sites of Former Titanian Seas?

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Abstract:
Features observed in the basins of Tui Regio and Hotei Arcus on Titan have attracted the attention of the Cassini-era investigators. At both locations, VIMS observed discrete 5-micron bright ~500-km wide features described as lobate in shape. Several studies have proposed that these materials are cryo-volcanic flows; in the case of the Hotei Arcus feature this inference was buttressed with SAR RADAR images showing bright and dark patches with “lobate” margins. We propose an alternative explanation. First we note that all landforms on Titan that are unambiguously identifiable can be explained by exogenic processes (aeolian, fluvial, impact cratering, and mass wasting). Suggestions of endogenically produced cryovolcanic constructs and flows have, without exception, lacked conclusive diagnostic evidence. Recently published topographic profiles across Tui Regio and the “lobate” feature region north of Hotei Arcus indicate these features appear to occur in large regional basins, at least along the direction of the profiles. SAR images show that the terrains surrounding both 5-micron bright features exhibit fluvial networks that appear to converge and debauch into the probable basins. The 5-micron bright features themselves correspond to fields of discrete radar-bright depressions whose bounding edges are commonly rounded and cumulate in planform in SAR images. These fields of discrete radar-bright depressions strongly resemble fields of features seen at Titan’s high latitudes usually attributed to be dry lakes. Thus the combination of (1) the resemblance to high-latitude dry lakes, (2) location in the centers of probable regional depressions, and (3) convergence of fluvial networks are inferred by us to best explain the 5-micron bright regions at Tui Regio and Hotei Arcus as sites of dry seas or at least paleolake clusters. Such equatorial seas, if real, may be evidence of substantially larger inventories of liquid alkanes in Titan’s past.

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11. Titan

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Newsworthy?: No
I have a video for Press Officer review,: No

Status: Complete

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